to the extreme tip of the conus medullaris. At the level of the lower lumbar region it attains its greatest size, and diminishes above and below this level. It lies throughout in close relation to the posterior commissure and, in the main, to the anterior part of the inner margin of the posterior horns. Posteriorly the tract has no definite margin. Its outer portion merges gradually into the part of the column behind it, Flechsig's middle root zone. The fibres which compose it can be seen entering it from the gray matter of the posterior cornu, and almost exclusively from that of the same side.

2.) The *septo-marginal tract* forms a racquet-shaped area or triangle, two of its sides being applied to the posterior median septum and to the periphery, respectively, and the third forming a somewhat indefinite margin between the degenerated and undegenerated parts of the cord, the anterior angle seemingly extending anteriorly to the cornu-commissural tract.

With reference to its origin, the evidence is still insufficient; the tract originates in part in the higher segments of the cord, gains greatly in bulk about the level of the first sacral segment, and terminates in the lower sacral and the coccygeal region, by sending fibres along the posterior median septum into the gray matter near the central canal, where they are lost among the other fibres in this part.

The author believes that in some parts of its path this is the same as Flechsig's "oval field." The tract is mainly descending, but Spiller and Dejerine have shown it to contain some ascending fibres.

Their function is undecided, but the evidence seems to point to their being connected with the lower organic reflexes. The paper is well illustrated and contains a partial bibliography. VOGEL.

59. ZUR LEHRE VON DEN SECUNDÄREN DEGENERATIONEN IM RÜCKENMARKE (Secondary Degenerations in the Spinal Cord). By Dr. B. Worotynski (Neurolog. Centralblatt, 16, 1897, No. 23).

Experiments were made upon dogs, in which total and hemilateral sections of the cord at different levels were practiced. In all, 18 experiments were performed, the animals surviving from 1 to 127 days. The author's results are summarized as follows:

1. Secondary degeneration of the individual systems in the spinal cord of dogs does not develop synchronously; the fibres of the posterior columns of Löwenthal's bundle degenerate first; then those of the direct cerebellar and of the antero-lateral tracts; finally, the fibres of the pyramidal tracts. In the human brain the same order seems to be followed.

2. Degenerative processes, once begun, develop rapidly, almost simultaneously throughout the entire extent of the tract.

3. In the columns of Goll and Löwenthal the degenerative process attains its maximum severity, which may be observed by the methods of Marchi, in the course of the second week following section of the cord; in the direct cerebellar and antero-lateral bundles, in the course of the third week; in the lateral pyramidal tracts it is still possible at the end of the fourth week to observe a general intensification of the degenerative process.

4. With Weigert's method the secondary degenerations, even three weeks after section of dog's cord, are hardly to be seen.

5. The order in which the secondary degenerations of the different columns show themselves corresponds approximately to that in which the systems receive their sheaths during development.

6. Kahler's law on the arrangement of the root fibres in the posterior columns can be accepted absolutely. The same law holds good with reference to the human brain.

7. Throughout the entire cord up to the cervical region the columns of Goll receive their fibres from the posterior roots. In the cervical cord the posterior root fibres enter the columns of Burdach.

8. The descending system of the posterior columns consists principally of myelogenic fibres. The bundles of descending fibres in the posterior columns, described by different authors under various names, belong to one and the same system, which at different levels of the cord changes its position and form.

9. In hemi-sections of the cord degenerations of the columns of Goll, Burdach, Flechsig, Gowers and Löwenthal are observed on both sides. The decussation of the columns of Goll and Burdach, and partly of Flechsig, takes place on the posterior commissure. The fibres of Gowers' and Löwenthal's bundles cross over principally in the anterior commissure.

10. The antero-lateral (Gowers') columns in dogs extend forward as far as the anterior fissure of the cord, and partly enter the anterior columns.

11. Gowers' and Flechsig's columns must be considered as belonging, anatomically, to one and the same system. A portion of both tracts terminates unquestionably in the cerebellum in the region of the nucleus dentatus and nucleus tecti. Decussion of part of these fibres occurs, in all likelihood, in the upper cerebellar vermiform process.

12. Descending degeneration of Gowers' and Flechsig's columns appears questionable. Such described degenerations must be attributed to the fibres of Löwenthal's bundle.

13. The existence in man of a separate descending system in the antero-lateral tract may be considered as proved.

14. The descending degeneration of the intra-spinal anterior roots from the point of section may be best explained by the passage into the former of fibres from Löwenthal's bundle.

15. The ascending degeneration of the intra-spinal anterior roots is occasioned by the passage into them of the direct cerebellar and antero-lateral fibres.

16. The traumatic degeneration, in the sense of Schiefferdecker, is only observed for a space of ½-1 cm. above and below the section.

17. In the anterior pyramidal tracts of the human brain are fibres which degenerate upward, and which may be separated to form a distinct system (Marie). MEIROWITZ.

PHYSIOLOGY.

60. A TENTATIVE EXPLANATION OF SOME OF THE PHENOMENA OF INHIBITION ON A HISTO-PHYSIOLOGICAL BASIS, INCLUDING A HYPOTHESIS CONCERNING THE FUNCTION OF THE PYRAMIDAL TRACTS. B. Onuf (State Hospitals' Bulletin, 2, 1897, p. 45).

The author offers the following theory to account for the phenomena of inhibition of the patellar reflexes: "For the excitation of a nerve cell the movement has to pass in the direction from the cell body or its protoplasmic processes toward the nervous process; for the inhibition of the cell the nerve current has to pass in the opposite direction, that is, from the nerve process, or its collaterals, back to the cell body. In other words, to produce excitation of a given cell the nerve current must enter this cell from the surface of its cell body or of its dendrites; but in order to inhibit or moderate the action of the cell the nerve current has to enter the cell from its nerve process or collaterals thereof."

Interpreted in anatomical terms, the author suggests that in the test of the knee jerk the peripheral motor neuron is acted upon in three ways: